

Remarks

Claims 1-24 are now pending in the present application, of which claims 1, 4, 6-9, 11-12, and 17-19 are amended. Claims 1-24 stand rejected. It is respectfully submitted that the pending claims define allowable subject matter.

Claims 1-24 are rejected under 35 USC § 103(a) as being unpatentable over Goto (U.S. Patent Application Publication 2004/0165766). Applicants respectfully traverse this rejection for reasons set forth hereafter.

Goto is directed to processing a volume of data to display images associated with the data. However, the processing techniques employed by Goto, as well as other things, are different from Applicants' claims. Turning to claim 1, claim 1 has been amended to recite, in part, "identifying a plane within said volume data set, the plane having a thickness; processing said plane within said volume data set to form multiple enhanced images; and presenting said multiple enhanced images simultaneously, said multiple enhanced images being based on said multiple anatomic features within said plane." In contrast, Goto does not identify a plane within the volume data set, either within CT data (as primarily discussed in Goto) or within an ultrasonic volume data set, as recited in claim 1.

Referring to FIG. 1 of Goto, no plane is identified within the volume image 1. Instead, Goto discloses CT value counting memories (indicated as MA on FIG. 1) for counting pixels that have a certain CT value or range of CT values. All of the pixels within the entire volume image 1 are evaluated to identify and count the pixels that have predetermined values. Goto states that "[t]he reference numerals 11A, 11B and 11C designate identical pixel values regions, that is, identical CT value regions in the respective CT images 11 to 1n. ... The identical CT value regions 11A, 11B and 11C illustrated in the drawing are exemplified as three regions having CT values of 5, 10 and 15, respectively." (Para 39, lines 1-9). Therefore, Goto evaluates the entire data set to identify CT values associated with pixels that may be located anywhere within the volume image 1.

Goto then displays images based on desired CT value(s) instead of displaying enhanced images from data within the plane, as recited in the claimed invention. To generate an

image, Goto applies different weights to specific pixels based on their associated CT value. Goto states that “[a]fter the counting process of FIG. 2A is finished, only data in a CT value counting memory MA having a specific CT value or a specific CT value range stored thereon are selectively displayed in order to display separately or emphatically a required portion of object to be examined in a specific internal organ, or the like, or data are weighted for every CT value counting memory so as to be displayed emphatically.” (Para 53, lines 1-8). For example, Goto may thus display an image based on one or more of the identical CT value regions 11A, 11B and 11C that have been identified from anywhere within the entire data set. Goto therefore teaches away from the recitation of processing said plane within said volume data set to form multiple enhanced images.

Goto is also silent to the recitation of the plane having a thickness. The only thickness that Goto is concerned with is the thickness associated with adjacent pixels that have the same CT value within the volume. Goto may provide further emphasis to larger objects, such as by displaying associated pixels more densely or darkly. (Para 65, lines 5-10). In other words, in Goto the image displayed “is formed so that a portion larger in gradient is expressed darkly.” (Para 97, lines 8-9). Therefore, claim 1 is patentable.

With respect to the independent claims 9 and 17, claim 9 recites “identifying a plane within said data set, the plane having a thickness; processing said data set within said plane with image enhancing techniques; and presenting multiple images based on said data set within said plane, each of said multiple images being processed with a different image enhancing technique, said multiple images being presented simultaneously.” Claim 17 recites “said processor identifying a plane having at least one thickness within said volumetric data set being transverse to said series of adjacent scan planes, said processor processing said plane with image enhancing techniques; and an output for presenting multiple images simultaneously, each of said multiple images being processed with a different image enhancing technique.” For reasons set forth above for claim 1, Goto does not disclose the recitations of claims 9 and 17. Accordingly, claims 9 and 17 are patentable over Goto for at least the reasons set forth above.

Turning to the dependent claims, claim 3 recites “selecting volume rendering techniques, said multiple enhanced images being based on said volume rendering techniques.”

Claim 7 recites “selecting volume rendering techniques to enhance said multiple anatomic features, said volume rendering techniques being one of surface texture, maximum density, minimum density, average projection, gradient light rendering, and maximum transparency.” In contrast, Goto does not disclose the use of volume rendering techniques. As directed to ultrasound, Goto only states that “[i]ncidentally, in MRI images or ultrasonic images, density values are used as pixel values corresponding to CT values.” (Para 135, lines 5-7). Therefore, Goto limits image processing to the use of the CT values (or density values), specifically disclosing the method that “comprises a counting step, a weighting step and an image displaying step” (Para 9, lines 8-10), which applies different weights to the CT values. Therefore, claims 3 and 7 are patentable.

Claim 12 recites “identifying a depth based on said data set, said plane having different thicknesses based on at least one of said depth and said different image enhancing techniques.” Claim 19 recites “said processor identifying a depth based on said volumetric data set; and at least one thickness control setting said at least one thickness based on at least one of said depth and said image enhancing techniques.” As discussed previously with respect to claim 1, Goto does not disclose a plane or a thickness of the plane. Goto also does not disclose identifying a depth associated with the image data set. Therefore, Goto is silent to defining one or more different thicknesses based on one or both of a depth associated with the data set and image enhancing techniques.

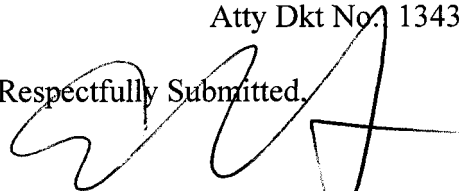
Applicants further submit that the dependent claims recite additional subject matter not anticipated or rendered obvious by the cited prior art. Moreover, the dependent claims are allowable based at least on the dependency of these claims from the independent claims.

In view of the foregoing amendments and comments, it is respectfully submitted that the prior art neither anticipates nor renders obvious the claimed invention. Should anything remain in order to place the present application in condition for allowance, the Examiner is kindly invited to contact the undersigned at the telephone number listed below.

PATENT

Atty Dkt No.: 134366 (SPLG 1027)

Respectfully Submitted,

A handwritten signature in black ink, appearing to read 'Evan Reno Sotiriou', written over a horizontal line.

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